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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

1934

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BRANCH OF RESEARCH

April, 1934

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Management - Mountain Region

Buell made the third periodic felling of dogwood saplings in the study to determine at what season cut trees of this species sprout least vigorously. Buds had already appeared on the stumps of trees felled March 1. Preliminary observation indicates that these new shoots are arising from dormant rather than epicormic buds.

Further measurements on all of the yellow poplar and cucumber crop trees on Plot 2, Stony Fork, N. C., were taken by Margaret Abell. These data will be used in a study to determine which type of tree makes the best crop tree. The trees were classed as stout, medium, or spindly and the following measurements taken: general description of tree, average height of surrounding vegetation, length of last years height growth, diameter at 1 foot and at 1/2-height, crown length and width, number of branches, total length of branches, and the diameters of trees cut within 1 foot, 2-3 feet, and 3-6 feet. Diameter breast high, height and crown class were measured in the summer of 1933 when the cleaning was made. Four of the 32 subplots were controls and of the others, four were given a complete treatment. On the rest of the subplots crop trees were spaced 11 x 11 feet, 16-1/2 x 16-1/2 feet, and 22 x 22 feet with light and heavy release for each spacing.

Also pictures were made of typical crop trees of both species which illustrate the range of variation of all the measurements taken. Before taking these pictures the trees were sprayed with white kalsomine according to a method developed by C. A. Abell. The dry kalsomine is applied to the tree with a dust gun such as is used in dusting plants for insect control. A large cloth placed behind the tree keeps the other vegetation and the ground free of kalsomine and is removed before taking the picture. In this way the crop tree is made to stand out while the surrounding vegetation is also shown in the picture.

Streamflow and Erosion

For investigations of methods of revegetating and protecting gullying and sheet eroding areas, Loughead planted, within or adjacent to the Bent Creek Experimental Forest, 900 pounds of lespedeza, clover, and grass seed; 5000 stem cuttings of Populus sp., willow, and locust; and 2000 1-0 shortleaf pine seedlings.

Silting basins for observing the nature of silt or other materials carried by streams, and ponding basins with V-notch weirs, have been installed on the Coweeta Experimental Forest by Creasman. Stevens type-L water-level recorders will be used for recording stream level. The same type of instrument may be used in connection with rain collectors to take the place of other types of intensity rain guages.

(Over)

Fire Damage

On April 26, the third of a series of experimental burning plots at Bent Creek, in a very dense young stand of hardwoods and pine, was subjected to a fire judged to be of slightly more than average intensity for spring burns. Fire temperatures were measured by means of spirals of fusible metal alloys suspended at heights of 5, 10, 15, 20, and 25 feet above ground. Three spirals of alloys melting at 100, 200, and 400 degrees C respectively, were suspended at each of these heights. (The method is briefly described in Journal of Forestry for April, 1934) Approximately 450 spirals were used in 29 setups distributed over the plots. The following table gives some idea of temperatures attained.

Height above ground Feet	Melting points of alloys. Degrees C. 100	200	400
	Percent of spirals melted or distorted		
5	100	96	60
10	96	93	35
15	93	90	18
20	93	88	7
25	89	41	0

It is significant that at 25 feet above ground, which is well into the crown of the average tree on the plots, temperatures equivalent to the boiling point of water were reached in 89 per cent of the setups. The effect of these temperatures on the crowns is yet to be determined.

Fire Weather

Except for five days at the beginning of the month, fire weather conditions were very favorable during April. Rainfall was both plentiful and well distributed. From April 6 to the end of the month rain fell in some portion of the mountain region nearly every day. In Asheville amounts exceeding .04 inches fell on 10 days.

Although there was plentiful soil moisture the development of the vegetation at the end of the month was appreciable behind that of 1933. Temperatures were lower than last year, though close to normal, and the nights were particularly cool. The conditions of the vegetation, accompanied by high temperatures and deficient rainfall during the first week in May, resulted in a high fire hazard.

The first Annual Fire Weather Summary was distributed to forest offices in the district. This publication contains summaries of the year 1933 and offers comparisons of temperature and rainfall with that of previous years.

Forest Biology

A study of damage to nursery stock on the Bent Creek Experimental Forest revealed for the first time the presence of the little harvest mouse

(Genus reithrodontomys) in this mountain region. Consistent trapping had until now failed to yield any of this species, and from the nature of their work it is fortunate that they are so scarce. A plantation of mountain pine (Pinus pungens) averaging two feet in height, in the Station's arboretum at Bent Creek, was found to have been completely destroyed during the late winter and early spring by these rodents, the outer bark and cambium of the seedlings being eaten off from the ground line to almost the tip. Here the deciding factor was undoubtedly the dense growth of broom sedge which partially concealed each tree and afforded protection to the mice. Four harvest mice, 2 males and 2 females, were caught in traps set at the base of these pines, and this proved rather conclusively their guilt, despite their reputation for harmlessness. Pine mice (Genus Pitymys) are usually responsible for such damage, but in this case there was no evidence that they were present.

Forest Entomology

St. George and Huckenpahler took samples from 25 trees to determine the distribution of moisture in healthy shortleaf pine at the beginning of the growing season.

Huckenpahler has been analyzing data on different methods of making moisture determinations of the wood of pine. A comparison was made between auger borings, increment cores, and cross section methods of determining moisture per cent. The auger method was consistently lower than the other two. Results show a very close correlation of values obtained by the cross section and the increment core methods.

Forest Pathology

Diller has been obtaining data on age of infection of shortleaf pine with the pine canker disease and on average annual precipitation in the Allegheny and Southern Appalachian Regions and on the Ozark and Ouachita National Forests in Arkansas. Lohman has continued the inoculation studies, working largely with loblolly pine at Winston-Salem, North Carolina.

A study of the twig blight of western yellow pine, a disease which is causing considerable damage to Pinus ponderosa in Arizona, has been started in connection with the laboratory work.

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CALIFORNIA FOREST EXPERIMENT STATION

Forest Management - Pine Region

Stanislaus Branch

Site factor and seasonal growth observations were continued at Stanislaus Branch by Lloyd. After a very mild winter with all snow gone a month earlier than usual, growth in trees started almost a month earlier than in the past three seasons. Germination of seed at

lower stations was prevented by early drying of the top soil. White fir at the open stations germinated early and was all destroyed by a low temperature of 19°F. The four rodent exclosures functioned well, but elation over this apparent victory was short lived. A hitherto unobserved type of insect damage appeared as seedlings germinated, greatly reducing the number available for observation. Perhaps the mice kept the insects in check before.

Black's Mt.

Drew with nine assistants resumed the inventory and mapping of the ponderosa pine experimental forest April 23. The compilation of last season's data was completed during the winter. Compartment boundaries and roads located on paper are being staked on the ground by two road locators. Construction of logging roads will be continued about May 15.

Feather River

Stand improvement work by the region got under way on several forests with Dunning and Hasel participating in preparation of instructions and preliminary training of men. About ten 30-man camps will operate. Eradication of brush with seeding and planting preceded by rodent control will be tried at four locations. Some purely experimental plot work will be carried out by Stowell of the Experiment Station.

Forestation

Kennett Area

Termination of the CWA during April brought to a close our activities in the smelter-fume area. Willow planting was stopped on March 1, pine seedspotting on April 1, and a survey crew under leadership of the erstwhile job superintendent worked at mapping the treated area until the closing date. During the 11 weeks of planting approximately 1,200,000 willow cuttings were planted in the gullies of some 500 slope-acres, and 450,000 seedspots were sown on 800 slope-acres, chiefly to ponderosa and Jeffrey pine, incense cedar, and black oak. Smaller quantities of native redbud, toyon, buckeye, ceanothus, sunflower and a few test areas of black locust were sown in sites best adapted to them. A few hundred nursery plants of pine, cedar and ceanothus were also planted in selected sites for comparison with the seedspots.

Recent inspection of the area revealed vigorous sprouting of the willows everywhere and good germination in the pine and black oak seedspots. The uniformity of this success is due in large measure to the good work of rodent control done under the direction of E. E. Horn of the Biological Survey. A second clean-up operation by his crew was necessitated when warm weather in mid-April brought out of hibernation swarms of ground squirrels which proceeded to exercise their teeth on hundreds of fine black-oak seedlings.

Range Research

The range survey of the San Joaquin Valley has entered the second phase which aims primarily at a representative cross section of the range forage plants by major vegetative types as blocked out by Wieslander. Bentley and

Magee, comprising one crew, are working the northern part of the valley; Short and Johnson are handling the southern portion. From the west side of the valley, just completed, information has been recorded from 480 temporary sample plots.

In cooperation with the Region a detailed topographic survey of the San Joaquin experimental range in the foothills fronting the Sierra Forest, has been started. C. A. Davidson, detailed from the Division of Maps and Surveys of the Regional Office, has organized a crew of four CCC men for this job which, it is estimated, will require about two months for completion.

Klugh, under the direction of Renner, completed vegetative write-ups from 85 temporary sample plots on this area, to serve as reference information of conditions at the time of establishment of this range. Data on the growth and stages of development of the annual plants especially, were needed because foothill forage this year is drying considerably ahead of time. The past winter was very mild and precipitation, to date, in that locality is only about 50 per cent of normal.

Erosion Streamflow

Flood Conference

The causes and consequences of the New Years flood in the Montrose District of Southern California were made the subject of a conference, on March 23, of the Conservation Association of Los Angeles County. The papers and discussions at this meeting presented by prominent engineers and foresters, covered subjects in which there is at present such wide-spread interest that an enumeration of their titles is given here, in the event that workers in this field who might wish to secure copies can do so. The proceedings of the meeting are being issued in mimeograph form at one dollar per copy by the Association's Executive Secretary, George H. Cecil, Chamber of Commerce Building, Los Angeles.

1. Impressions of University forestry faculty . . . .
   Professor Walter Mulford

2. Evaluation of Watershed
   Areas .....Regional Forester, S. B. Show

3. Is Watershed Management for Water
   Production Incompatible with Flood
   Control .....H. S. Gilman, Civil Engineer
   & Mgr. San Dimas Water Co.

4. Work of California Forest Experiment
   Station in Study of Forest Influences
   and in the Prevention and Control of
   Fires ..... E. I. Kotok

5. Study of the Flood by California Forest
   Experiment Station .....C. J. Kraebel

6. Need for Planning in the Development of Residential Foothill Areas

   (a) Fires .....L. A. County Forester, Spence D. Turner

   (b) Flood and Debris Control .... E. C. Eaton, Chief Engineer, L. A. County Flood Control District.

7. Public Education and Fire Prevention .....State Forester, M. B. Pratt

8. Need for a Coordinated Forest Protection and Flood Control Program .....Consulting Engineer, J. B. Lippincott

Discussions were led by Regional Engineer E. W. Kramer, and by other engineers concerned with the water problem in Southern California.

San Dimas Experimental Forest

The volume of work accomplished on this project during recent months, with the total personnel of 196 CCC men, 225 CWA men, 8 Station staff members, and several engineers from the Regional Office, is so great that it cannot be adequately reported here. The specific jobs accomplished included, in part, the following:

(a) Construction of many miles of contour trail at elevations of 3,100 and 4,950 feet.

(b) Fire breaks in strategic places below the two sets of triplicate watersheds.

(c) Installation of rain gages, bringing the total of established gages to 257.

(d) Installation of new sensitive water height gages which employ Neon lamps to flash contact between gage point and water surface.

(e) Construction of several large Parshall flumes to record the flow of streams from intermediate watersheds from one to two square miles in area.

(f) Erosion control work on all roads traversing the experimental watersheds with particular attention to the sections which contributed large quantities of debris to Bell Canyon Reservoirs No. 1 and 2 during the New Year storm.

(g) Preliminary soil reconnaissance for the purpose of planning the detailed soil survey of the forest.

(h) Reconnaissance for the placement of shrub and tree lysimeters and erosion plots.

Continuous application to these tasks by the technical staff under Sinclair's immediate direction has been impossible from the start by reason of frequent interruptions from visitors, both individual and in groups. Should the pressure from this source increase or even continue at its present rate, provision will have to be made to delegate the equivalent of one man's full time to this task. Interesting as have been the records accumulated during the winter, pressure of work at the moment does not permit condensing them for this report.

Erosion Control - Roads

Quite apart from the spectacular results of the New Year's storm in the Pickens Canyon burned area, we have obtained valuable experience on several projects of road erosion control. On the San Gabriel road project, for example, the earlier storm of December 11, which brought a rainfall of approximately six inches, had caused several failures in our slope fixation work. In many cases the failures were directly traceable to accumulated runoff water from the road surface, due to inadequate drainage. Since our slope fixation methods are not designed to withstand surface drainage, these failures do not discredit the method.

In other instances, however, failure resulted from a general sloughing out of the water-sodden top soil, carrying our lightest contour wattles with it.

This is the first time in our experience that such a thing has occurred and it taught us a timely lesson in the folly of false economy. Realizing that the appropriation for control work on this project was inadequate for completion of the job, we had been gradually reducing the size of our wattles and the size and number of stakes, the purpose being to find the very least amount of workthat would hold the slope. Somewhere in this process of reduction we passed the safety line, at least for heavy storms, and subsequently a storm on December 11 revealed the weak places.

Profiting by this experience, we immediately strengthened the work by the use of larger wattles, and anchored the surface soil to the more stable subsoil by the use of longer stakes. This work, developed on the ground by Engineer-Foreman Edwin Kramer, proved completely successful and all work put in subsequent to the mid-December storm withstood successfully the record heavy storm of December 30 and 31. We have reason to feel that a method of road slope fixation which survived the New Year's rainfall of 12.5 inches may be regarded as satisfactory for general use in southern California.

The method is considerably more costly than the lighter treatment previously used and indications are that the cost may run to $500 per acre This matter of cost, however, is extremely tricky on such road jobs and particularly under present conditions. It is unwise to make any mention of dollars in connection with such projects and, in the formal reports on this work, we shall probably present costs in terms of man-days, truck-days and similar criteria.

The Experiment Station has supplied quantities of native shrub and tree seeds to a number of road erosion control projects on the Angeles, Santa Barbara, San Bernardino and Cleveland Forests.

The Station also organized an inter-community and county project under the CWA for slope fixation and landscape planting of a scenic highway known as the Grizzly Peak - Skyline Boulevard in the Berkeley Hills behind the University of California and the city of Oakland. This work was done under the administrative supervision of the Alameda County Engineer and under the technical supervision of the Experiment Station. Kraebel prepared the general plan and Dave Ilch was the staff member in immediate control. Ilch is also our "peripatetic technician" in road erosion control and devoted several weeks to a tour of all road fixation projects in the south.

A complete report on the San Gabriel Canyon road project has been prepared under Kraebel's direction by Engineer-Foreman Kramer for the purpose chiefly of recording the improvements in method developed during the winter and of perfecting the costkeeping system. A revision of the road erosion control handbook is contemplated.

Erosion Control - Mountain Meadows

The last week of April saw the completion of a "Handbook on Erosion Control in Mountain Meadows" on which Kraebel and Pillsbury have been working intermittently during the winter. This is a 69-page mimeographed booklet illustrated with numerous sketches and photographs. Two sentences from the foreword epitomize the objectives:

> With respect to dams and other control structures, it should be clearly understood that these are regarded as temporary but necessary aids in the process of restoring vegetation. We look to vegetation, not dams, for permanent control and to that end our efforts are directed towards hastening the process of vegetative recovery.

Copies are being mailed to all Forest and Range Experiment Stations. The meadow restoration work was done last summer by the CCC, but this season it will be done under NIRA. Two technicians employed by Assistant Regional Forester Nelson to handle the field work will be directed by Pillsbury.

Fire Research

A Precision Anemometer

The need for accurate measurements of wind velocity in the study of rate of spread of fires has necessitated the development of a special anemometer for velocities from zero to fifteen miles per hour.

The hot-wire type of anemometer was chosen as best suited to the requirements of the job. It consists of a 3-inch length of .006 inch diameter platinum wire heated by an electric current and the necessary rheostats and meters to control and measure the current. The electrical resistance of the heated platinum wire varies as its temperature which in

turn varies as a function of the wind velocity. To measure wind velocity it is only necessary then to measure the differential in current flow through the platinum wire.

The resolving power of the instrument developed at this station varies from 2% at one mile per hour velocity to 0.8% at ten miles per hour, compared with approximately 15% for mechanical anemometers. The instrument is to be calibrated in a wind tunnel for different air temperatures to check the theoretical equations for air temperature corrections. The lag in the response of the instrument to variations in wind velocity is dependent upon the type of milliammeter used to measure the differential in current flow, but in any case it is much less than that of the conventional mechanical types of anemometers.

The necessary meters and rheostats are mounted on a bakelite panel in a case 24 x 12 x 12 inches which is fitted with all the accessory equipment except the power supply which is a six volt storage battery. Included on the instrument panel is a neon lamp controlled by a rheostat and condenser in such a manner that it flashes at any desired time interval to facilitate the recording of wind velocity measurements. The total cost of materials used in the anemometer including batteries is slightly less than $100. At a somewhat higher cost the instrument could be equipped with a self-recording milliammeter, thus making it adaptable to permanent installations where precision measurements of velocity are desirable.

For details of the theory and application of the hot-wire principle reference is made to (1) the Philosophical Magazine, series 6, Vol. 29, 1915, pp. 556-577, "Precision Measurements of Air Velocity by Means of the Linear Hot-Wire Anemometer," by L. V. King, and (2) N.A.C.A. Technical Memo. #264, A. Magnan.

Forest Products

After having been nicked out of earlier Resnira allotments by the Presidential restrictions on the use of that fund, the California Station Products section has been succored by three CWA appointments, of whom two have worked largely on the woods and mill computing on account of their superior technical training and experience in lumbering work. One of these, Mr. Chas. L. Tebbe, has graduated to a NIRA Junior Forester appointment. This, with the similar appointment of Mr. H. R. Josephson, for the Requirements studies, previously noted in these reports, once more gives our Products section manpower enough to speed accomplishment in its projects, in spite of the lapsing of CWA.

Mr. Tebbe has had lumbering experience with the Red River Lumber Company in California, then went to the Philippines as sales representative of the Caterpillar Tractor Company in the lumbering field, and was selected there to plan and install the logging system of the Cadwallader-Gibson Lumber Company in the Islands. His experience fits him peculiarly for logging and milling study work.

Woods and Mill Studies

The unusual and the extraordinary are becoming regular diet in the matter of interruptions to the finishing of Brundage's magnum opus on this study. This month it was the proposed purchase of a National Forest in the redwood region, tentatively approved by the National Forest Reservation Commission last month, which necessitated a rapid examination of practically the entire region in which Brundage accompanied Person and Regional Logging Engineer Berry. This trip took them through parts of all the larger private holdings in the 300-mile belt of the Redwood region and provided a birds-eye view from ridge roads of most of the intervening territory. Professor M. E. Krueger of the U. C. Division of Forestry, who was formerly a logging engineer in the redwood region, joined the party for a couple of days.

After the field examination, four major blocks, each of which would form a suitable topographic unit from the angle of National Forest administration, were outlined, and a report is now being prepared for the Reservation Commission.

There is need for intensive studies of present logging methods in the region and demonstration forests to serve as testing grounds for new methods designed to reduce the prevailing heavy losses and destruction. In the northern part of the region, where the oldest and heaviest stands are found, the loss between volume of logs cut in the woods and volume of lumber reaching the green chain is commonly estimated by operators to be from 40 to 50 per cent. Destruction of reproduction and small trees not cut comes pretty close to 100 per cent wherever slack-line logging is preceded and followed by broadcast burning. Sprouts from stumps restock, on the average, only about 15 per cent of such devastated areas.

Without a doubt, the greater share of the region - perhaps 80 per cent in the south and 60 per cent in the north, is easily loggable by caterpillar tractors and the various auxiliary equipment now available for use with tractors. How far operators can go beyond these percentages into the steeper territory with the bull-dozer road network system recently developed in the Douglas fir region is an open question which can be answered only by giving the method a thorough-going trial.

Whether or not the purchase of a National Forest in the redwood region is finally consummated within the next year, the Station will go ahead with a preliminary series of logging studies at once. Brundage has cooperated with Person and Hallin in drawing up a plan for diesel yarder, gas yarder, tractor, slack-line, high-lead, sky-line, loading and railroad transportation studies. Only a few tractors are in use but the operation of these few will receive more attention by the field study crew than any other one yarding system.

The regular redwood-region project personnel of the two men who have been working with Person on stocking and growth studies, supplemented by one new technical assistant, will begin the time studies as soon as the plan is approved. It is hoped this field force can at least be doubled before the season is very far advanced so that adequate data on all principal logging methods will be ready for compilation before next spring.

Wood Requirements - Building Construction

A limited amount of information on building demolition was obtained at the County Assessor's office in Oakland, Calif. A sample of 131 wrecked dwellings indicated a demolition rate of 5% in 20 years, 20% in 30 years, 48% in 40 years, 78% in 50 years, and 97% in 60 years. At the same time there exist in the same sections of Oakland dwellings of various ages, of which 7% were under 20 years of age, 20% under 30 years, 42% under 40 years, 72% under 50 years, 94% under 60 years, and 99% under 70 years of age. No data show, however, what proportion of the original dwellings have been demolished.

The average demolition age, is undoubtedly greater than indicated, for wrecking of the many existing old buildings now in poor condition will raise the average. The average age of the buildings still standing, on the other hand, is probably less than indicated, for many of the original dwellings were undoubtedly demolished at a relatively early age prior to 1927.

In this comparatively small sample there was little difference in age between the dwellings wrecked because of commercial obsolescence and those demolished because of age or fire damage. The old apartments and flats appear to be used about as long as detached dwellings.

A field survey of 1908 dwellings was made to determine both the types of wall covering used on the residences of Oakland and Berkeley, and the types of garages built with the new dwellings. Results indicate that about 91% of the dwellings built within the last 6 or 8 years were covered with stucco, while rustic siding, drop siding, shingles, and batten boards were used on about 8% of the new houses. Of the older buildings, however, stucco covered only 42%, with shingles, drop, and rustic siding being used on 58% of the old residences.

A sample of 826 garages disclosed the fact that 54% of the new houses have a garage included in the basement or on the first floor. Of the detached garages 27% used stucco, 14% had wood siding, and 5% were of other than frame construction.

The proportions of exterior wall coverings used on the new dwellings, as indicated by this survey, agree rather closely with those given by building permits.

Wood Requirements - Wood Using Industries

This project was practically cleaned up when CWA lapsed, in so far as concerned the personal canvass of schedules sent us by Washington. Our experience, however, in getting practically 100% execution, by personal contact, on schedules not returned to Washington by mail and which there was pretty clear indication never would have been returned by that route, makes us exceedingly regretful to leave Washington's very large "No Reply" list to die in that status when we could so certainly get a large percentage of execution on it with a man and a little travel money and two weeks more time.

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Recent developments in Ohio forestry

In the March report mention was made of the recent development of local sentiment in Ohio for federal aid in public forest acquisition. Assistant Regional Forester A. C. Shaw spent several days in Ohio during April, and with Baker made contacts with State Forester Edmund Secrest, Dr. J. I. Falconer of the State Planning Commission, Dr. Chas. E. Holzer, President of the Ohio Valley Conservation and Flood Control Congress, and Mr. Bryce Browning of the Muskingum Conservancy District. As a result of the interest of these men, an Enabling Act was passed early in May at a special tax session of the Ohio legislature, but due to a slight difference in the form of the bill as passed by the Senate and the House, a technicality has arisen which apparently will prevent its approval by the Governor. It is expected that the necessary correction in the bill can be made at the next special session of the Legislature, which may be called soon.

CWA Project Terminated

The last of the Station's CWA projects was completed and the employees dismissed on April 27. Four of the office assistants have been retained temporarily for other emergency work financed by ECW research funds.

The work of the two enumerators who have been carrying on the survey of wood using industries was completed about the middle of April. Failures to get returns, in a few instances, were followed by letters which have brought only one additional finished schedule. The use of personal enumerators, while expensive, doubtless has yielded a larger return and better data than could have been secured in any other way.

Branch stations

Sylamore-Arkansas

The Sylamore Experimental Forest was approved by the Forester on March 28, 1934. Kuenzel and his Impnira crew have practically completed the forest survey, timber estimate and maps. The final improvement projects are now being undertaken with the construction of a small office-dormitory building, a woodshed, and a gasoline and oil storage shed. The Resnira program, involving the establishment of management plots on this area, will be started in June when all the other work will be finished.

Shawnee-Illinois

Day has made two trips to Illinois during April in connection with the acquisition of land and improvement plans for the proposed Shawnee Branch Station. There are now approximately 1000 acres under option within the exterior boundaries of the proposed experimental forest. A very desirable headquarters' site has been located within a tract of old-growth oak and yellow poplar, which, according to natives, is probably ~~the~~ best stand of timber remaining in Southern Illinois. Plans and specifications for buildings

to be constructed with Impnira funds are being prepared, and work will start as soon as the land is purchased.

Hacker Creek-Indiana

The CWA work on the Hacker Creek experimental area on the Morgan-Monroe State Forest in Indiana terminated late in April. The area has been surrounded by an effective fire line, roads and trails have been improved, the area has been surveyed, and a large scale topographic and type map has been completed. An ample supply of concrete and wooden corner posts for boundary and plot markers has been made. Work on the headquarters building being provided by the State Forestry Department has been halted temporarily by a shortage of available carpenters.

Portsmouth-Ohio

Plans have been approved for the headquarters cabin proposed for construction by the State Forester on the Station's experimental area near Portsmouth, and construction is expected to follow at once. A map and survey of the area, and the establishment of a number of management plots, will be started in June with Nira funds.

Forest Site Study

Auten spent the month of April continuing data analysis, compilation, and writing the report dealing with his site study of black locust and walnut plantations. His article: "Calcium and Magnesium Losses from the Cultivation of Forest Land", appeared in print in the April issue of the Journal of Forestry. (Vol. XXXII, No. 4.).

Forest Planting

Volume and Yield Study

The merchantable cubic foot table for plantation black locust was completed during the month. This table, based on 290 trees, was 0.66% low in aggregate deviation and the average percentage deviation on 283 trees was 9.5%. The Scribner board foot table finished by Schumacher last month has been issued as Station Note No. 10 and the merchantable cubic foot table has been issued as Station Note No. 11. Copies of these and Station Note No. 9 (International 1/8" kerf to 5" top) were distributed late in the month.

Schumacher and Myer continued the compilation of the locust yield plots. Entries for Scribner volume were entered and checked. This work was halted April 19th with closure of CWA work, but was resumed by Myer at a later date under ECW funds.

Plantations of Scotch, red, and white pines at the Columbus Boy Scout Camp were remeasured. Scotch pine planted in 1929 now averages about 6-1/2 feet in height, and has grown much better than either the red or white pine.

Forest Planting Survey

Dr. A. G. Chapman has been appointed Associate Conservationist (ECW) to carry on a survey of plantations in the unglaciated portion of the Station's

territory. It is planned to contact all agencies who have been active in planting, as well as to visit as many plantations as time allows. The purpose of the survey is to appraise the net results of past effort and to choose the most promising species and methods for general use, as well as for further intensive study. Dr. Chapman started the preparations for this planting survey on April 2, and will start field work early in May.

Farm Woodland Management

Dr. O. D. Diller has been appointed from the Junior Range Examiner list of eligibles as Technician (ECW) to assist Day with the studies of farm woodland management. During April the management plans for this project have been revised, and the plan of work for the 1934 season has been completed. Regeneration plots have been classified according to the needs for remeasurement. Some of them have reached the stage where further changes are relatively slow, and annual remeasurements are no longer needed.

The manuscript by Day and DenUyl covering the three-year grazing capacity and injury study at the Pinney-Purdue Farm is being published by the Purdue Agricultural Experiment Station. It is expected to appear in print within a few weeks. Diller has prepared an article for publication in the Indiana Farmer's Guide dealing with "Crop Reduction and the Farm-woods". With the proposal that land formerly in crops now be devoted to forage and pasture, the need for grazing woodlands may be lessened. Another article by Diller: "The Relation of Temperature and Precipitation to the growth of Beech in Indiana" will be submitted to the Ohio Journal of Science.

Locust Borer Investigation

Hall and Wilford spent the first week in April collecting root samples of black locust for Dr. Swingle, Bureau of Plant Industry, who is experimenting in the propogation of locust from root cuttings. Hall spent a week in Illinois with Extension Forester, L. E. Sawyer, establishing a cooperative locust plantation for the borer study, on the property of Mr. Gustafason. Field studies of locust borer survival were also carried on during April, and plans were made for summer work.

Dr. Craighead visited the Station for several days, and during his stay he visited a number of locust borer study plots in eastern Ohio.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

The outstanding event of April for us is the completion of the basic forest inventory statistics for western Oregon and western Washington, putting them into 190 mimeographed tables and 114 figures in an edition of 150 copies and distributing them to those most likely to use them. This is the culmination of years of field work and an immense amount of office work, but is of course just the beginning of the various forms of forest survey releases.

The lecture course, which the Station's men have been giving this winter at Oregon State School of Forestry, was concluded for the season by Wilson's three lectures (in one day) on inventorying physical and economic factors affecting the use of land. We feel that this series of talks, in which ten of our men have participated, has been very beneficial to the Station and its personnel in the furtherance of our work as well as to the forestry school students themselves.

Section of Silviculture

Fire Studies

One hundred fifty sets of hazard indicator sticks were prepared to be used this summer at selected locations. Considerable time was devoted to planning the location of the 100 fire danger stations to be established on the national forests of R-6 this coming summer, to the drafting of suitable methods for keeping records at these stations and to the preparation of equipment. The CCC camp near Wind River has made 150 instrument shelters. A simple method was designed to replace relative humidity tables, the use of which has in the past resulted in so many errors in interpreting wet-dry bulb thermometer readings. Interest in the special glasses designed for lookouts is being maintained, the latest request for assistance coming from the Oregon National Guard where the glasses are being considered as an aid in observing artillery fire.

Matthews completed a rush job for State Forester Cronemiller in analyzing the fire reports for private land fires in western Oregon to determine exactly how much damage results from logging fires as compared to fires from other causes. Each county was worked up separately, and these data will be used by the fire wardens and the state forester to refute the mistaken idea of many loggers that their fires are infrequent and cause very little damage. For the 12-year period, 1921-1932, logging has caused 11 per cent of the fires on private land in Oregon's Douglas fir region, but these fires are responsible for about one fourth of all burned-over acreage, 37 per cent of the total damage, and more than a third of the total fire fighting costs.

Some preliminary analyses of the Douglas fir slash disposal data show that on areas where the slash is burned, the fire hazard drops to almost nothing as a result of the fire, but the fire encourages the development of a type of vegetation which tends to increase the fire hazard until this vegetation has been shaded out by coniferous trees. The peak of this "after burning" fire hazard is reached in about 8 years, and thereafter declines rapidly if the areas restock with trees. The fire hazard on unburned areas remains very high for about 12 years and then begins to decline slowly.

Douglas Fir Silviculture

The branch station at Wind River was opened during the month. In most parts of the Pacific Northwest, the winter has been exceptionally mild, and in the vicinity of Wind River Isaac estimates that the vegetation is four

or five weeks in advance of normal development. Forestry students from Oregon State College and from the Montana Forest School visited Wind River during the month. The local forest schools make this trip each year.

Ponderosa Pine Silviculture

Kolbe spent a couple of days with the president of the J. Neils Lumber Company looking over the operations of this company in central Washington. This company has decided to change its methods of cutting in order to lengthen the life of its operation.

A modification of the stocked quadrat method was devised for application by the forest survey in the ponderosa pine region. The stocked quadrats method is satisfactory for immature stands on selectively cut pine lands if two sets of quadrats are observed at each examination point. One quadrat, 13.2 x 13.2 feet, is used for reproduction, and another quadrat, 20.9 x 20.9 feet, is used for saplings, poles and larger trees. The system thus adapts itself to a mixed age stand.

An analysis of 20 years of examinations of natural reproduction on ponderosa pine sample plots shows that the rate of restocking in this type is exceedingly slow and uncertain. On one plot only 10,484 seedlings per acre have started in 20 years and only 11 per cent of these are alive now. On another plot, less than 5,000 seedlings per acre have started in the 20-year period. These plots indicate what may be expected after fairly light cutting, leaving from 5 to 12 M board feet per acre. On one Forest Service sale area there has been no increase in the number of established seedlings since cutting was concluded 6 years ago. This particular area has 4 types of cutting, including seed trees and the standard Forest Service method. There was a good seed crop two years after cutting, and some seedlings did start but were killed by rodents and adverse weather conditions.

Mensuration

Four sample plots and one check plot were established in areas of sapling Douglas fir, which were thinned by CCC help during the winter. Each plot is located in the center of a 2-acre patch, one-half of which was thinned and pruned as high as could be reached and the other half thinned only. Unfortunately, on two of the plots Nature thought she would help along by making an additional thinning by means of a sleet storm. The damage was very spotted and was not confined to the thinned areas but extended into unthinned stands. The thinning apparently was not the prime cause of the damage, although it may have been contributory to the extent of damage. Douglas fir lends itself well to pruning, since the dead limbs can be cut closely to the bole without injury to the tree, and even live branches can be removed without excessive bleeding. The wounds are quickly healed.

Section of Forest Products

General

Interest has been shown during the month in the formulae for end coatings, in the effectiveness and method of using Lignasan, in the probable markets for ponderosa pine bark among users of hogged fuel in the Portland district, and in the possibility of marketing the gum from Sitka spruce.

Lumber and Log Census

Johnson devoted his entire time in an effort to bring the 1933 lumber and log census to early completion. Aside from the necessary office work, Johnson spent 13 days in the field and Lodewick six days, picking up delinquents and securing additional information. During the month 343 completed schedules were forwarded to Washington, making a total of 1675 to date. It is expected that the work will be completed by May 10, or about 30 days earlier than in past years.

Forest Economics

Selective Logging

Brandstrom left for Washington, D. C. on April 7 for about a two month's detail. While in Washington, he will work with B. P. Kirkland in preparing Part II of the series of bulletins dealing with selective logging in Douglas fir and the financial aspects of timber management. In Brandstrom's absence, Rapraeger carried on his work until called to Washington May 1.

Rapraeger drew up a preliminary working plan for the Herman Creek Block on the Umpqua National Forest, in line with Brandstrom's concept of selective control in timber properties, and it has been the subject of several conferences with Forest Management and the operator.

New Public Domain

One-inch-to-the-mile maps of Lane County, Oregon, showing tax delinquent and publicly owned lands, were completed. Similar maps for the eighteen counties studied went through final checking and correction. All of these maps now are ready for reproduction. Compilations of certain numerical data progressed sufficiently to permit assembly and arrangement for the preliminary office report.

Forest Survey

As already mentioned, the big achievement of the month was completing mimeographing and binding of the booklets of forest survey forest statistics for each of the 38 counties in western Oregon and western Washington and distributing them to all local agencies and individuals. Samples of these county statistics will be sent to agencies outside the two states early in May.

Progress was made on the 1-inch-to-the-mile type map negatives for western Oregon, with all but one forest in Oregon completed and 60 per cent

of the land outside the national forests in Oregon completed. The loss of CWA help has slowed down progress on this job.

Early in April, Pratt and Wakeman with compassmen, together with 3 temporary check cruisers and their compassmen, started check cruising in Klickitat and Yakima Counties, Washington. These two counties have county cruises reputed to be of good quality. The end of April saw this work practically completed in Klickitat County.

Girard has practically completed the distribution of sawtimber volumes into accessibility zones for all of the 38 counties in western Oregon and Washington. During the latter part of the month he has been checking the survey's check cruisers working in eastern Washington.

Early in the month the drafting and checking of the tracings for the new 1/4-inch-to-the-mile base maps of the east half of Oregon and Washington was completed and these tracings were forwarded to Washington for printing. They will be the base for the colored forest type maps to be lithographed on completion of the project.

After a conference of survey staff members with the Regional Office, certain minor revisions in the east side type scheme were made. Other minor changes have been made in the tentative east side working plan, and this plan is now practically ready for mimeographing.

April has seen the usual run of requests for survey statistics, maps and other data, and the advent of the Lumber Code has resulted in a very large number of requests for type map data and also the survey's ownership records.

Forest Insurance

Practically the whole of April was devoted to preparation of the final report on the Pacific Coast territory. This involves revision and editing of the reports already written, retyping and putting in such shape that the results of the whole study to date are presented in a single report which will be fully completed with all maps, charts, and tables before the end of May.

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SOUTHERN FOREST EXPERIMENT STATION

General

The Station was honored by a visit from Secretary of War Dern on April 3, when he was shown the Olustee Experimental Forest and the Osceola National Forest in company with Demmon, Harper, Lehrbas, and Supervisor Hadley. The Secretary was much impressed with the work of the Forest Service, and upon his return to Washington listed this as one of the two most impressive things he had seen on his trip.

Dr. Franz Heske, Professor of Forest Management at the Dresden Polytechnical University at Tharandt, Germany, visited both Lake City and New Orleans before attending the annual meeting and field trip of the Gulf States Section of The Society of American Foresters, at Alexandria and Urania, La. At both Lake City and New Orleans he addressed the staff on the use of aerial surveys in forestry. His reactions and comments on the field trip were very stimulating. Dr. Heske also visited Bogalusa with Wakeley and addressed the Gulf States Section meeting on sustained-yield forestry in Europe.

Dr. Thomas E. Snyder, who has been assigned to the Station by the Bureau of Entomology, visited the Station for a few days in April prior to assuming his official duties on July 1.

A. E. Wackerman has resigned from the staff, effective May 1, to become Forester for the Southern Pine Association. His new duties will be chiefly in connection with Lumber Code regulations under Article X.

Following a request from Washington for assistance in the preparation of a report to answer the Hale Resolution, concerning the pulp and paper industry, a comprehensive statement was prepared. It was estimated that the South as a whole could produce some 42,000,000 cords of pulpwood annually, or over three times our present national needs, if pulpwood were the only crop. A mill producing kraft paper in the South requires about 540,000 acres of forest to give a sustained annual output of 100,000 tons of paper. On this basis, the South could support over 100 paper mills on its 128,000,000 acres of commercial forest land if only trees less than 12-14 inches were cut into pulpwood.

Experimental Forest Development (Crossett, Arkansas)

Reynolds and a large CWA crew continued work on the development of the Crossett Experimental Forest. By the end of the month, a total of 9 miles of right-of-way had been cleared, the merchantable material measured and removed, and the brush burned. Half of this right-of-way was 20 feet wide, half was 14 feet wide, and a total of 3.5 miles was ditched and graded. Sites for headquarters and an arboretum, totaling 10 acres, were cleared and fenced. The data collected from the clearing of right-of-way are especially interesting. The forest had been logged 18 years ago to an 11-inch diameter-breast-high limit and periodic fires had occurred except during three of the last five years. Despite this treatment, the area in right-of-way yielded on an acreage basis an average of 5,000 board feet of pine and hardwood sawlogs, 7 cords of pine pulpwood, and 1-1/2 cords of chemical wood from hardwoods. No matter how closely one may figure, this indicates an increase in value of at least one dollar per acre per year--with a complete lack of forestry practice. The yields under forest management should be very much higher.

Forestation

Wakeley examined the loblolly pine plantations which were established in 1926-27 at Bogalusa to test the suitability of seed from various sources (regions). The trees from Louisiana seed were very much the best, those from Conroe, Texas, seed ranked next (about 20 per cent lower in total height), and

those from Dierks, Arkansas, and Athens, Georgia, seed were tied for last place (about 30 per cent lower in total height than the Louisiana trees). Now 7 years in the field, the plantations have largely developed these differences during the last 3 years.

The annual remeasurement of the 8 and 9-year-old longleaf pine plantations at Bogalusa was also made. The 8-year-old plantation showed less than normal height growth. The trees now average 6 to 7 inches in height and reach a maximum of 9 feet. In the 9-year-old plantation, correlation of brown-spot infection with height of defoliated trees showed the greatest infection on trees 10 inches, 15 inches, and 25 inches in height, in that order. This relation is presumably the result of coincidence of spore flight with development of one of the two to four annual spurts of new growth on the trees.

In the Catahoula Nursery, on the Kisatchie National Forest, despite the necessity of sowing before installation of the sprinkling system, the seedlings are developing satisfactorily. Enough seed has been sown to produce 4 million longleaf, 4 million slash, and 2 million shortleaf pines. Sowing was completed April 20.

In the Station's experimental beds designed to increase the tree percentage obtained, germination is well under way, and even at this early date, striking differences are observable on some of the treatments. Computations of results to date are now in progress.

Weeding is perhaps the chief concern of the administrative force, and is focusing interest on the Station's $ZnSO_4$ treatment for weed control. The treated blocks show markedly fewer weeds than the untreated checks.

Ecology

Pessin submitted to "Science" a paper entitled "Effect of flowering on the rate of growth of the terminal shoots of longleaf pine." He found that in a 25-year-old second-growth stand the shoots bearing male flowers grow the most slowly, the shoots bearing no flowers grow at an intermediate rate, and the shoots bearing female flowers grow the most rapidly. The ratio of growth is about 1:1-1/2:2 for the three classes, in the order named.

Management

An analysis was made by Bull of the first remeasurement of a series of thinning plots in loblolly pine, established by the Great Southern Lumber Company and now administered jointly by that company and the Station. The trees were 25-1/2 years old when the plots were established, in June, 1928, and 30 years old when remeasured. One plot is a check and two plots are thinned--one to 106 crop trees per acre and one to 265 crop trees per acre. Small trees not interfering with the crop trees were left, but all interfering trees were cut for pulpwood. The salient data of the remeasurement are as follows:

Plot	Number of crop trees per acre	Average d.b.h. in 1928 (inches)	Increase in d.b.h. 1928-33 (inches) Range	Average
Heavily thinned	106	6.6	0.2 to 1.9	1.11
Check for comparison	108	7.3	0.1 to 1.2	0.62
Lightly thinned	265	6.5	0 to 1.1	0.34
Check for comparison	264	6.6	0 to 1.2	0.46
Fastest-growing 50 trees per acre				
Heavily thinned			1.1 to 1.9	1.45
Lightly thinned			0.8 to 1.1	0.88
Check			0.7 to 1.2	0.88

The diameter-breast-high growth has been disappointingly slow during the 4-1/2 years since thinning. The 106 crop trees per acre on the heavily thinned plot are growing faster than even the best 50 trees per acre on the lightly thinned and check plots but 1.1 inches in 4-1/2 years is in itself a poor showing. The lightly thinned plot shows no advantage in growth over the check plot. The relatively poor response to thinning to date is probably due very largely to the fact that the thinnings were not made until the stands had already stagnated in growth to a very marked extent. At least the heavy thinning was heavy enough to have been very beneficial, but it was delayed too long.

Financial Aspects of Private Forestry

The field work of the case study in south Georgia of the financial aspects of producing naval stores was completed, with the exception of the study of gum yields, by Evans and a CWA crew. The gum yields will be measured during the present season by a man furnished by the operator. Evans is now compiling the field data in New Orleans.

New Public Domain

Following the analysis of the Arkansas field data, county studies as heretofore conducted are being discontinued and instead, tax-delinquency studies will be correlated with the broad land-use studies of the Economics staff. A final report on Arkansas is being prepared which will combine the general report on State-wide conditions with a summary of county data. This report is now about two-thirds completed.

Forest Survey

During the month, 15 Survey crews, working in Georgia, Florida, and Tennessee, covered with line-plot survey approximately 4-1/2 million acres, bringing the total area surveyed up to 33 million acres. Field work and survey reports will cover units of from 4 to 11 million acres. Early in the month, work was begun on the second of these survey units in the

naval-stores belt of Georgia. Two naval-stores units in this State were established because of dissimilar site conditions existing in the Atlantic coastal plain area of eastern Georgia and the rolling upland area typical of much of southwestern Georgia. In addition to the line-plot survey work, a special study of the rate of growth of trees during the turpentine operation was established in Georgia. The rate of growth of unturpentined longleaf pine trees in this region has been studied, but no data are available to determine the retarding influence of chipping on the rate of growth of longleaf and slash pine trees of given diameter. The rate of growth as determined by this study will be applied to the turpentine trees in the regional stand table built up as a result of the line-plot survey data. From this calculation will be derived the future volume of turpentine trees.

In addition to the timber inventory expressed in conventional board-foot units, the Survey will show the present supply of certain standard forest products such as poles and piling, etc. To do this, a special study was undertaken by Mr. Caskey, an expert on pole and piling utilization, to show the number of poles of given length and grade according to American Standards Association pole specification that could be cut in each of the naval-stores pine survey units.

The wood used in the curing of bright-leaf cigarette tobacco constitutes an important item in the wood-depletion study for certain parts of Georgia and South Carolina. Data obtained by the Survey indicate that approximately 1-1/2 cords of wood per thousand pounds of cured tobacco are used in this curing process. Under the existing market agreement, Georgia's tobacco quota for 1934 is 59 million pounds. Accordingly, approximately 90 thousand cords of fuelwood, mostly black gum and oak, will be required to cure this quantity of tobacco in the State of Georgia alone. Similar studies are being made for the purpose of determining the quantity of fuelwood used in the distilling of turpentine and in the manufacturing of syrup.

Survey field sheets thus far received from the Norris Dam watershed area (under the supervision of the Tennessee Valley Authority) indicate that forest occupies less than 50 per cent of the land area in the Clinch-Powell River watersheds. The survey in these watersheds covers a portion of the area tributary to the Norris Dam. The percentage of agricultural or abandoned agricultural land has a direct bearing upon the silting-up of the reservoir.

Preliminary stand figures on 458 quarter-acre survey plots established in the coastal region of southeast Georgia indicate that the volume of material suitable for pulpwood in trees 6 inches and over in diameter breast high is:

Average stand per acre:	Pine	3.7 cords
	Pulping hardwoods	3.5 cords
	Other hardwoods	1.0 cord
	TOTAL	8.2 cords

Forest Pathology

As a study correlated with the sanitary effect of a single fire on the occurrence of the brown-spot needle blight of longleaf pine seedlings, some observations were made near Bogalusa, Louisiana, on the effect of

last winter's fire on seedling mortality. The seedling stand studied was 13 years old, and a previous fire had occurred in March, 1928. Additional information on the relation between seedling height and fire damage was desired. Eight weeks after the fire, all seedlings on 14 plots totaling .11 acre were measured and grouped by 3-inch height classes. The data are as follows:

Height class	Total number of trees	Per cent mortality
0- 3"	1,768	16
3- 6"	496	35
6- 9"	154	71
9-12"	60	90
12-15"	24	100
15-18"	8	100
Above 18"	56	16

Mortality due to the fire was greatest among those seedlings that were 6 to 18 inches tall, and least where seedlings exceeded 18 inches or were under 3 inches in height.

Tests are now being conducted in cooperation with State nurseries in Louisiana and Mississippi to work out a method of control for a serious nursery disease of black locust seedlings. Experiments involve preliminary treatment of nursery soil with fungicides prior to planting. Other areas will be sprayed periodically with solutions of Bordeaux mixture after the seedlings have germinated.

Mr. Howard Lamb has been recently appointed Junior Pathologist to help in the experimental control of diseases of black locust in nurseries.

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RESEARCH, REGION 2

Type Study (T-1):

CWA computors were engaged during the entire month in transcribing and compiling the wind, humidity and evaporation record for the 17 field stations at which routine observations are made. In order to push the work as much as possible and to check inaccuracies in the field notes, it was necessary for Roeser to devote considerable of his time to this project. Upon termination of the work, it was estimated that the job of bringing the meteorological record to date and placing it in shape to permit of prompt summarization had been 97 per cent accomplished. Some checking still remains to be done.

Cutting Methods in Spruce Type (Mc-146):

The record of the 1933 remeasurement of the three Spruce-lodge plots on the Arapaho Forest was compiled and a 12-year record of growth is now

available. These are the plots, during the logging of which, extensive and, to a large extent, unnecessary damage was done to the residual stand, more especially to that portion of the stand represented by the youngest age class. In fact, the loss thus occasioned was so heavy as to open the stand on the heavily cut plot beyond the anticipated density, thus aggravating a supposedly serious situation relative to wind damage. The results for the second period after cutting (8th to 12th growing season, inclusive) afford an interesting comparison with those of the first period, and very definitely point out the excellent recuperative powers of the local spruce type. This is shown by the following data:

Plot No. & Character of Treatment	Stand Left			Increment per acre-annum (cu.ft.)			
	Basal Area Sq.ft.	Volume Cu.ft.	Volume Bd.ft. (Scribner Dec. C)	First Period: Net	First Period: Gross	Second Period: Net	Second Period: Gross
1 - Heavy Cut	90.4	3082	11301	-19.9	26.8	60.5	63.3
2 - Moderate Cut	130.7	4635	17842	-16.0	30.7	48.0	69.6
3 - Light Cut	177.3	5966	22541	15.9	44.9	37.2	62.4

The net increment during the second period in terms of board feet (full Scribner scale) per acre-annum amounted to 242,203, and 142 for Plots 1, 2 and 3 respectively. These figures represent increases over those for the first period of 310, 249 and 48 board feet per acre-annum for the respective plots.

Particularly significant is the fact that the gross increment rate for the stands on the two more heavily cut-over plots has forged ahead of that of the lightly cut stand. The difference between the three plots is not large, however. So far as net increment during the second period is concerned, the rate for the plot is proportional to the degree of cutting, with the heavily cut-over plot having the largest rate. Plots 1 and 2, representing the heavy and moderate degrees of cutting, show very substantial increases over their rate during the first period, during which both experienced a loss in aggregate living volume. The difference between net and gross increment rates represents the volume lost through the death of living trees and the fact that this difference (during the second period) increases directly rather than inversely with the volume of the respective stands apparently indicates that wind plays a less important role as a mortality producing factor than was originally thought to be the case.

Seed Production in Douglas fir, Fs 161 (c):

The first observation of the flower crop for the new season was made in mid-April. Below 8,000 feet elevation, most of the flowers had emerged from their buds and an exceptionally heavy crop appeared to be in prospect. This early emergence, no doubt, is in response to the mild and open winter that has prevailed throughout the Rocky Mountain region and to the advent

of an early spring. The past March was the tenth consecutive month for Colorado as a whole to show an excess of temperature over normal, and the record for April will probably show this month to be the eleventh in the series. Unless an unexpected cold spell comes along, the situation is favorable for a high percentage of "set" in this species (Douglas fir). However, past experience in this study indicates that early flowering in Douglas fir usually results in a relatively high rate of mortality, especially in trees growing at the lower elevations of the species' range.

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L. A. Isaac	Seedfall under a Virgin Forest (for Service Bulletin)
W. H. Meyer	Review of Second-Growth Yield, Stand and Volume Tables for the Western White Pine Type by I. T. Haig, Tech. Bull. 323 (for The Timberman)
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T. T. Munger	The Lumber Code and Forestry (for Annual Cruise)
P. A. Briegleb	Supplemental reports on Clackamas County, Oregon to accompany forest survey inventory data.
P. A. Briegleb	Supplemental reports on Washington County, Oregon to accompany forest survey inventory data.
P. A. Briegleb	Measuring Stocking on Ponderosa Pine cutover Lands.
E. D. Buell	Supplemental reports on Polk County, Oregon to accompany forest survey inventory data.
E. D. Buell	Supplemental reports on Thurston County, Washington to accompany forest survey inventory data.
F. L. Moravets	Supplemental reports on Snohomish County, Washington to accompany forest survey inventory data.
F. L. Moravets	Supplemental reports on Skagit County, Washington to accompany forest survey inventory data.
C. W. Kline	The Proposed Cascade Head Experimental Forest, Siuslaw National Forest.

WASHINGTON OFFICE

TRANSLATIONS

Om Vara Skogsforyngringsatgarders Inverkan Pa Salpeterbildningen I Marken Och Dess Betydelse For Barrskogens Foryngring. (On the Effect of Our Forest Regeneration Efforts in Producing Nitrate in the Soil and Its Importance in Regenerating Our Spruce Forests.) by Henrik Hesselman, in Skogsvards-Foreningens Tidskrift, No. 1, January, 1918. Translated from the Swedish by Christian Mygind, April, 1934.

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